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09/773,546	02/02/2001	Yoshiki Kuhara	33035 M 059	8047

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EXAMINER	
PHAN, HANH	
ART UNIT	**PAPER NUMBER**
2633	6

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/773,546	KUHARA ET AL.	
	Examiner	Art Unit	
	Hanh Phan	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 February 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. Figures 3-6 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claim 5 is objected to because of the following informalities: in claim 5, the phrase "the detection light reflecting gratings are provided on the substrate" should be changed into --the detection light reflecting gratings are provided on the optical fibers--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3, 4, 6 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minami et al (US Patent No. 6,310,702) in view of Komatsu et al (US Patent No. 6,192,170).

Regarding claim 1, referring to Figure 7, Minami discloses an optical communication device comprising:

at least one light guide (i.e., optical fibers No. 1 to No. 8, Fig. 7) provided for guiding signal light;

at least one optoelectronic device (i.e., Optical Network Unit ONUs, Fig. 7); and

a detection light reflecting filter (i.e., filters 41 to 48, Fig. 1) on the light guide (optical fibers No. 1 to No. 8) which reflects detection light of a wavelength (i.e., test light having 1.6μm band) different from the signal light (i.e., light signal having 1.31/1.55μm band) and leads the signal light (see col. 1, lines 12-40).

Minami differs from claim 1 in that he fails to teach a substrate which the light guide provided on and the optoelectric device chip mounted upon the substrate and the detection light reflecting filter is a detection light reflecting grating. However, Komatsu in US Patent No. 6,192,170 teaches a substrate (101)(Fig. 1) which the light guides (103)(Fig. 1) provided on and the optoelectric device chips (i.e., semiconductor lasers LD 102, Fig. 1) mounted upon the substrate (101) and the detection light reflecting filter (104)(Fig. 1) is a detection light reflecting grating (see col. 1, lines 30-59). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the substrate which the light guide provided on and the optoelectric

device chip mounted upon the substrate and the light reflecting filter is a detection light reflecting grating as taught by Komatsu in the system of Minami. One of ordinary skill in the art would have been motivated to do this since Komatsu suggests in column 1, lines 46-59 that using such a substrate which the light guide provided on and the optoelectric device chip mounted upon the substrate and the detection light reflecting filter is a light reflecting grating have advantage of allowing reducing the parts cost (for example, it does not require optical lenses), the manufacturing cost, the size of the device, and simultaneous narrowing the radiation angle of the emitted laser beam thereby to reduce an optical coupling loss with optical waveguide.

Regarding claim 3, Minami as modified by Komatsu above discloses all the aspects of the claimed invention as set forth in rejection claim 1 above. Komatsu further teaches the substrate (101)(Fig. 1) is a silicon substrate, the light guide (103)(Fig. 1) is a Si02 type light waveguide produced upon the silicon substrate (101) and the detection light reflecting grating (104) is formed upon the Si02 type light waveguide (103)(see col. 1, lines 18-58). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the substrate is a silicon substrate, the light guide is a Si02 type light waveguide produced upon the silicon substrate and the detection light reflecting grating is formed upon the type light waveguide as taught by Komatsu in the system of Minami. One of ordinary skill in the art would have been motivated to do this since Komatsu suggests in column 1, lines 46-59 that using such a substrate is a silicon substrate, the light guide is a Si02 type light waveguide produced upon the silicon substrate and the detection light reflecting grating is formed upon the

type light waveguide have advantage of allowing reducing the parts cost, the manufacturing cost, the size and weight of the device, and reducing the optical coupling loss and simultaneous narrowing the linewidth of the laser diode output.

Regarding claim 4, Minami as modified by Komatsu above discloses all the aspects of the claimed invention as set forth in rejection claim 1 above except fails to teach the substrate is a plastic substrate made of a polymer, the light guide is a plastic light waveguide produced upon the plastic substrate and the detection light reflecting grating is formed upon the plastic light waveguide. However, it is well known in the art that a substrate includes a plastic substrate made of a polymer or a silicon substrate or both of them, the light guide includes a plastic light waveguide produced upon the plastic substrate or a Si02 type light waveguide produced upon the silicon substrate, and the detection light reflecting grating includes formed upon the plastic light waveguide or the Si02 type light waveguide. Komatsu clearly teaches one of them can use such as silicon substrate. Moreover, whether to use one of them or both of them would have been within the knowledge of a person having ordinary skill in the art and would have been an obvious engineering design choice. Therefore, it would have been obvious to obtain a substrate is a plastic substrate made of a polymer, the light guide is a plastic light waveguide produced upon the plastic substrate and the detection light reflecting grating is formed upon the plastic light waveguide in order to reduce the parts cost, the manufacturing cost, the size and weight of the device and simultaneous to narrow the radiation angle of the emitted laser beam thereby to reduce an optical coupling loss with optical waveguide.

Regarding claims 6 and 11, Minami as modified by Komatsu above discloses all the aspects of the claimed invention as set forth in rejection claim 1 above. Komatsu further teaches a plurality of independent light waveguides (103)(Fig. 1) with the detection light reflecting gratings (104) are provided on the substrate (101) and an optoelectronic device are LDs (i.e., Laser Diodes 102) is allocated at an end of each of the light waveguides (103) for exchanging a plurality of signals via a plurality of fibers (see col. 1, lines 14-58). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the plurality of independent light waveguides with the detection light reflecting gratings are provided on the substrate and an optoelectronic device are laser diodes is allocated at an end of each of the light waveguides for exchanging a plurality of signals via a plurality of fibers as taught by Komatsu in the system of Minami. One of ordinary skill in the art would have been motivated to do this since Komatsu suggests in column 1, lines 14-59 that using such a plurality of independent light waveguides with the detection light reflecting gratings are provided on the substrate and an optoelectronic device are laser diodes is allocated at an end of each of the light waveguides for exchanging a plurality of signals via a plurality of fibers have advantage of allowing providing an optical device which is able to output laser beams of a plurality of desired types of oscillation wavelengths at the same time.

Regarding claim 10, Minami further teaches all the optoelectronic devices are photodiodes for receiving a plurality of independent signals simultaneously (as indicated in Fig. 7, inherently, there are photodiodes as optical receivers in the ONUs for

receiving a plurality of independent signals simultaneously, i.e., the system is provided with 1.31/1.55μm wavelength multiplex transmission system, see col. 1, lines 12-40).

Regarding claim 12, Minami further teaches wherein m optoelectronic devices are LDs (laser diodes) for transmitting a plurality of independent signals simultaneously and k optoelectronic devices are PDs (photodiodes) for receiving a plurality of independent signals simultaneously (as indicated in Fig. 7, inherently, there are optoelectronic devices are light emitting sources as optical transmitters in the ONUs for transmitting a plurality of independent signals simultaneously and there are photodiodes as optical receivers in the ONUs for receiving a plurality of independent signals simultaneously, i.e., the system is provided with 1.31/1.55μm wavelength multiplex transmission system, see col. 1, lines 12-40).

6. Claims 2 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minami et al (US Patent No. 6,310,702) in view of Komatsu et al (US Patent No. 6,192,170) and further in view of Higashi (US Patent No. 5,937,120).

Regarding claim 2, Minami as modified by Komatsu above discloses all the aspects of the claimed invention as set forth in rejection claim 1 above except fails to teach the light guide is a silica optical fiber mounted upon the substrate and the detection light reflecting grating is formed upon the optical fiber. However, Higashi in US Patent No. 5,937,120 teaches the light guide (10)(Figs. 1 and 2) is an optical fiber mounted upon the substrate (1)(Fig. 1) and the light reflecting grating (13)(Fig. 2) is formed upon the optical fiber (10)(Fig. 2)(see col. 1, lines 5-8 and lines 38-67, col. 2, lines 1-8, and col. 3, lines 28-58). Therefore, it would have been obvious to one having

skill in the art at the time the invention was made to incorporate the light guide is an optical fiber mounted upon the substrate and the light reflecting grating is formed upon the optical fiber as taught by Higashi in the system of Minami as modified by Komatsu. One of ordinary skill in the art would have been motivated to do this since Higashi suggests in column 2, lines 21-24 that using such a light guide is an optical fiber mounted upon the substrate and the light reflecting grating is formed upon the optical fiber have advantage of allowing providing an optical device which is able to achieve good optical coupling efficiency and also emit a light with a single wavelength.

Regarding claim 17, Minami as modified by Komatsu and Higashi above discloses all the aspects of the claimed invention as set forth in rejection claim 2 above except fails to teach the substrate is a complex substrate being composed of a smaller first substrate of silicon single crystal and a larger second substrate being made of plastic and having a cavity and the substrates are coupled by putting the first substrate in the cavity of the second substrate. However, it is well known in the art that a substrate includes a full plastic substrate or a full silicon substrate or includes both of them. Whether to use one of them or both of them would have been within the knowledge of a person having ordinary skill in the art and would have been an obvious engineering design choice. Therefore, it would have been obvious to obtain the substrate is a complex substrate being composed of a smaller first substrate of silicon single crystal and a larger second substrate being made of plastic and having a cavity and the substrates are coupled by putting the first substrate in the cavity of the second

substrate in order to reduce the cost of whole of system because using double substrate (silicon and plastic) is less expensive than an entirely silicon substrate.

Regarding claim 18, it would have been obvious to obtain the optoelectronic device is mounted upon the smaller first substrate and the fiber is supported by both the first and the second substrates in order to provide an optical device which is able to achieve good optical coupling efficiency and also emit a light with a single wavelength and reduce the cost of whole of system.

Regarding claim 19, it would have been obvious to obtain the first substrate and the second substrate have V-grooves dug along center lines in longitudinal directions, the fiber is partially held by a ferrule and the ferrule is supported by the V-groove on the second substrate and the fiber is supported by the V-groove on the first substrate in order to provide an optical device which is able to achieve good optical coupling efficiency and also emit a light with a single wavelength and reduce the cost and size of whole of device.

7. Claims 5 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minami et al (US Patent No. 6,310,702) in view of Komatsu et al (US Patent No. 6,192,170) and further in view of Kato et al (US Patent No. 5,859,945).

Regarding claims 5 and 8, Minami as modified by Komatsu above discloses all the aspects of the claimed invention as set forth in rejection claim 1 above except fails to teach a plurality of independent optical fibers with the detection light reflecting gratings are provided on the fibers and an optoelectronic device are LDs (laser diodes) for transmitting a plurality of independent signals simultaneously is allocated at an end

of each of the optical fibers for exchanging a plurality of signals via a plurality of fiber. However, Kato in US Patent No. 5,859,945 teaches a plurality of independent optical fibers (2)(Fig. 1) with the detection light reflecting gratings (2a)(Fig. 1) are provided on the fibers (2) and an optoelectronic device (i.e., light emitting elements 1, Fig. 1) is allocated at an end of each of the optical fibers (2) for exchanging a plurality of signals via a plurality of fiber (2)(see col. 4, lines 18-46). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the plurality of independent optical fibers with the detection light reflecting gratings are provided on the fibers and an optoelectronic device is allocated at an end of each of the optical fibers for exchanging a plurality of signals via a plurality of fiber as taught by Kato in the system of Minami as modified by Komatsu. One of ordinary skill in the art would have been motivated to do this since Kato suggests in column 2, lines 4-30 and col. 1, lines 6-11 that using such a plurality of independent optical fibers with the detection light reflecting gratings are provided on the fibers and an optoelectronic device is allocated at an end of each of the optical fibers for exchanging a plurality of signals via a plurality of fiber have advantage of allowing providing an optical device which is able to output laser beams of a plurality of desired types of oscillation wavelengths at the same time.

Regarding claim 7, Minami further teaches all the optoelectronic devices are photodiodes for receiving a plurality of independent signals simultaneously (as indicated in Fig. 7, inherently, there are photodiodes as optical receivers in the ONUs for

receiving a plurality of independent signals simultaneously, i.e., the system is provided with 1.31/1.55μm wavelength multiplex transmission system, see col. 1, lines 12-40).

Regarding claim 9, Minami further teaches wherein m optoelectronic devices are LDs (laser diodes) for transmitting a plurality of independent signals simultaneously and k optoelectronic devices are PDs (photodiodes) for receiving a plurality of independent signals simultaneously (as indicated in Fig. 7, inherently, there are optoelectronic devices are light emitting sources as optical transmitters in the ONUs for transmitting a plurality of independent signals simultaneously and there are photodiodes as optical receivers in the ONUs for receiving a plurality of independent signals simultaneously, i.e., the system is provided with 1.31/1.55μm wavelength multiplex transmission system, see col. 1, lines 12-40).

8. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minami et al (US Patent No. 6,310,702) in view of Komatsu et al (US Patent No. 6,192,170) and further in view of Tsuchiya et al (US Patent No. 5,319,482).

Regarding claims 13 and 15, Minami as modified by Komatsu above discloses all the aspects of the claimed invention as set forth in rejection claims 3 and 4 above except fails to teach the light waveguide is Y-branched waveguides having a first light waveguide, a second light waveguide and a coupling part selectively connecting the first and the second waveguides, an LD is mounted at an end of the first waveguide for launching transmitting light into the end of the first light waveguide, a PD is mounted at an end of the second waveguide for sensing receiving light emitted from the end of the second waveguide and producing a photocurrent from the receiving light. However,

Tsuchiya in US Patent No. 5,937,120 teaches the light waveguide is Y-branched waveguides having a first light waveguide, a second light waveguide and a coupling part (14)(Fig. 2) selectively connecting the first and the second waveguides, an LD (i.e., optical transmitter OS, Fig. 2) is mounted at an end of the first waveguide for launching transmitting light into the end of the first light waveguide, a PD (i.e., optical receiver OR, Fig. 2) is mounted at an end of the second waveguide for sensing receiving light emitted from the end of the second waveguide and producing a photocurrent from the receiving light (see col. 1, lines 25-67 and col. 2, lines 1-12). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the light waveguide is Y-branched waveguides having a first light waveguide, a second light waveguide and a coupling part selectively connecting the first and the second waveguides, an LD is mounted at an end of the first waveguide for launching transmitting light into the end of the first light waveguide, a PD is mounted at an end of the second waveguide for sensing receiving light emitted from the end of the second waveguide and producing a photocurrent from the receiving light as taught by Tsuchiya in the system of Minami as modified by Komatsu. One of ordinary skill in the art would have been motivated to do this since Tsuchya suggests in column 1, lines 5-8 that using such a light waveguide is Y-branched waveguides having a first light waveguide, a second light waveguide and a coupling part selectively connecting the first and the second waveguides, an LD is mounted at an end of the first waveguide for launching transmitting light into the end of the first light waveguide, a PD is mounted at an end of the second waveguide for sensing receiving light emitted from the end of the second

waveguide and producing a photocurrent from the receiving light have advantage of allowing performing optical loop back and line tests in an optical subscriber transmission system.

Regarding claims 14 and 16, Minami as modified by Komatsu above discloses all the aspects of the claimed invention as set forth in rejection claims 13 and 15 above except fails to teach an amplifier is mounted on the substrate for amplifying the photocurrent of the PD. However, it is well known in the art that providing an amplifier to amplify the signal or increase the power level of signal. Therefore, it would have been obvious to obtain an amplifier is mounted on the substrate to amplify the signal or increase the power level of signal to a desired level.

9. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Minami et al (US Patent No. 6,310,702) and Komatsu et al (US Patent No. 6,192,170) in view of Higashi (US Patent No. 5,937,120) and further in view of Tsuchiya et al (US Patent No. 5,319,482).

Regarding claim 20, Minami as modified by Komatsu above discloses all the aspects of the claimed invention as set forth in rejection claim 1 above except fails to teach the light guide is a optical fiber supported in a V-groove made upon the substrate, an LD is mounted at an end of the fiber on a step of the substrate for giving transmitting light $\lambda 1$ to the fiber, a WDM filter inserted into a slanting slit cutting the substrate and the fiber for selectively reflecting receiving light $\lambda 2$ and a PD is mounted above the WDM filter upon the substrate for sensing receiving light $\lambda 2$ traveling in the fiber. However, Higashi in US Patent No. 5,937,120 teaches the light guide (10)(Fig. 1) is a

optical fiber supported in a V-groove (2)(Fig. 2) made upon the substrate (1)(Fig. 1), an LD (20)(Fig. 1) is mounted at an end of the fiber (10) on a step of the substrate for giving transmitting light λ1 (i.e., transmitting light at 1.3μm wavelength) to the fiber (10)(Fig. 1)(col. 3, lines 28-58) and Tsuchiya in US Patent No. 5,319,482 teaches a WDM filter (14)(Fig. 2) inserted into for selectively reflecting receiving light and a PD (i.e., optical receiver OR, Fig. 2) is mounted above the WDM filter (14) for sensing receiving light traveling in the fiber (col. 1, lines 28-67 and col. 2, lines 1-8). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the light guide is a optical fiber supported in a V-groove made upon the substrate, an LD is mounted at an end of the fiber on a step of the substrate for giving transmitting light λ1 to the fiber as taught by Higashi and the WDM filter inserted into for selectively reflecting receiving light λ2 and a PD is mounted above the WDM filter for sensing receiving light λ2 traveling in the fiber as taught by Tsuchiya in the system of Minami as modified by Komatsu. One of ordinary skill in the art would have been motivated to do this since Higashi suggests in column 2, lines 21-24 that using such a light guide is an optical fiber mounted upon the substrate and the light reflecting grating is formed upon the optical fiber have advantage of allowing providing an optical device which is able to achieve good optical coupling efficiency and also emit a light with a single wavelength and Tsuchya suggests in column 1, lines 5-8 that using such a WDM filter inserted into for selectively reflecting receiving light λ2 and a PD is mounted above the WDM filter for sensing receiving light λ2 traveling in the fiber have advantage

of allowing performing optical loop back and line tests in an optical subscriber transmission system.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Inoue et al (US Patent No. 6,188,495) discloses optical transmission reception system .

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh Phan whose telephone number is (703)306-5840.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached on (703)305-4729. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-4700.

Hanh Phan

10/02/2003